INSIDE: IN SEARCH OF THE ICE AGE FLOODS

Montana Outdoors

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MARCH–APRIL 2010

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FINDING FROZEN FISH

LESSONS FROM THE WOLF HUNT

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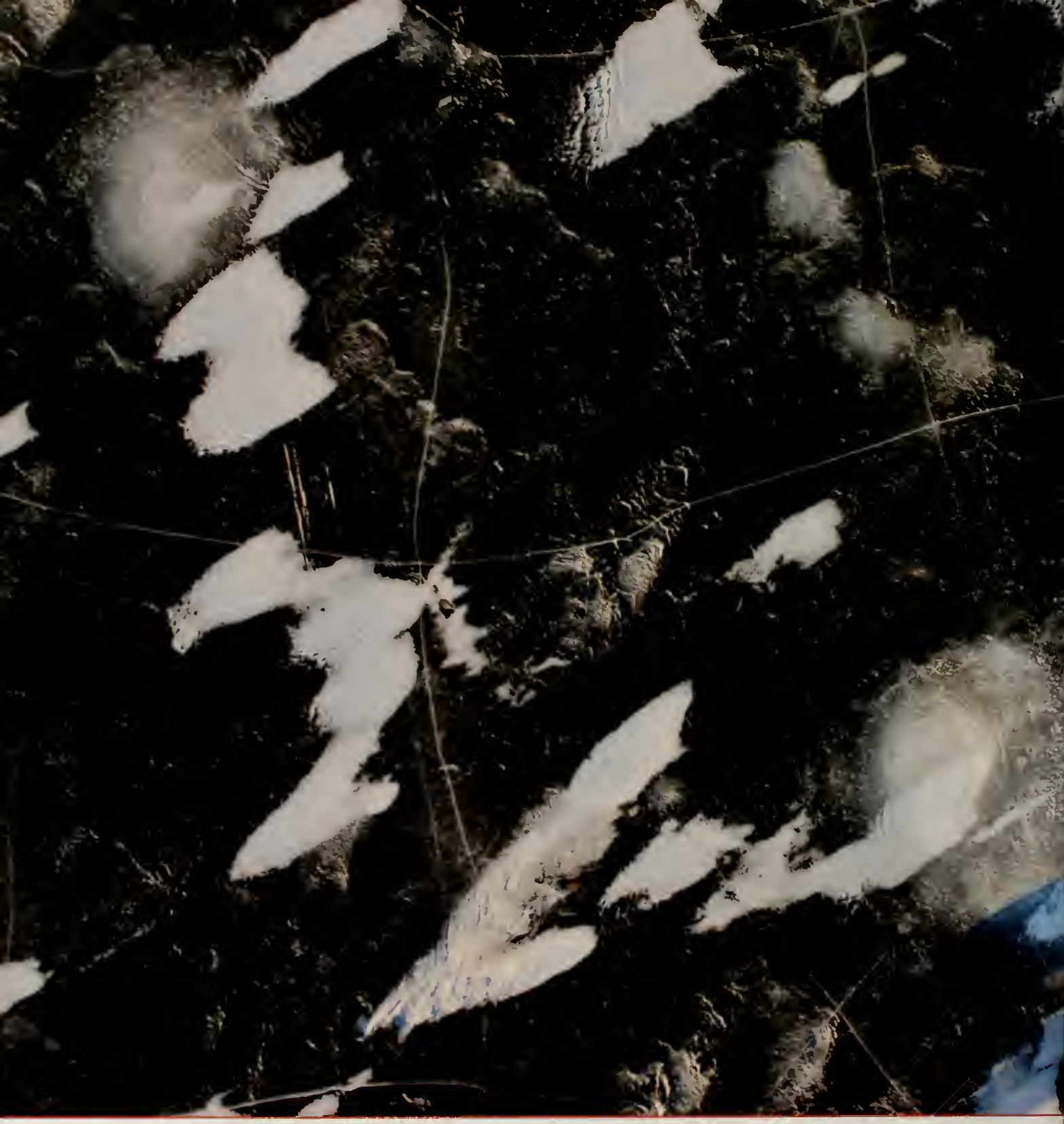

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Montana Outdoors

MARCH-APRIL 2010

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DEBRA KRANTZ

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HOLEY PLACE Ice anglers pray for bites on Canyon Ferry Reservoir. See page 8 to learn why new technology is making the sport easier and warmer. Photo by Chris Boyer.

FRONT COVER See page 26 to learn how the Leave No Trace program can help keep even more wild places clean and scenic. Rocky Mountain Front photo by Chuck Haney.

Wolf story raises hackles

Yes, as you say in your article ("Another Mouth To Feed," September-October), weather, hunter harvest, mountain lions, bears, and wolves all have an effect on deer and elk populations. But before we had so many wolves, our elk and deer populations always seemed to recover in a few years regardless of a high harvest or an unusually harsh winter. Wolves and wolves alone are responsible for the overall decline. Your charts in the article show that harvest numbers have their ups and downs but were always upward bound in any five-year period. Since wolf introduction, the numbers have never recovered to the good old pre-wolf days. Wolves are killing machines only, and the food chain functioned quite well without them since they were eliminated in 1930. They were killed off for a reason. My orange hat is off to all the hunters who gathered in Kalispell to protest wolves. Had I known it was happening, I would have been there too. I hope it happens again and again all over the state.

Wayne Leischner
Billings

I realize that hunting is a million-dollar industry in Montana. But after reading about the legal killing of wolves, bison, bears, mountain lions, elk, and deer in the November-December issue, I felt discouraged. Isn't it bad enough the way we have encroached on their habitat? The father of conservation, John Muir, said the life of every wild creature has value that has nothing to do with humans. The idea that everything wild needs to be "managed" by people is self-serving to certain lobbies. I wish

ANOTHER
MOUTH
TO FEED
Hunters in western Montana are feeling the pinch as the growing wolf population takes a bite into deer and elk numbers

I could have been there when Muir asked President Theodore Roosevelt why he hadn't outgrown the "childish" activity of hunting. I ask your readers the same thing.

James L. Altman
Lake City, FL

Two hundred years ago when Lewis and Clark came through Montana, there was much game and few people. Now there are many people and not much game. If we are unable or unwilling to control the human population, we must control the animal population. If we want more elk and deer for people to hunt, we must control the wolves.

I think if the wolf huggers want more wolves, let's reintroduce them into California and anywhere else they used to roam.

Lynn Carey
Seeley Lake

For the latest on Montana wolf management, see page 22.

Retirement plans

Thank you so much for your magazine, which I found by accident. My husband, a retiring veteran, still thinks of the Montana of his youth where some of the happiest times of his life were at his grandmother's ranch in the Bitterroots. I currently am deployed in Europe and the Persian Gulf (training multiple-nation forces for special operations) and am sending *Montana Outdoors* to him, as I know it brings him to a place he longs to return to, along with me, someday.

Charlotte G. Ward
U.S. Navy, Boblingen, Germany

Humbled by an old master

It was so many years ago that I thought I'd forgotten. Then I read John Barsness's story on mule deer ("Mulies in Plain Sight" November-December), and the memories came flooding back.

My younger brother and I, 16 and 17 respectively, were "master" mule deer hunters living near Melstone, which is northeast of Roundup. We had taken some very large mulies and bragged about it appropriately. Then this old guy, Newt Ingersoll, challenged us to hunt with him in the dry coulees. We never turned down a challenge and agreed. He said he'd show us the deer and give us first shot—and still he would bag his deer first.

We left town in the middle of the day, which seemed odd to us. Then we drove out onto some sagebrush flats. There could not be any deer here, we thought. We stopped at the head of a very large, dry coulee, and Newt got out and started looking through his binoculars. My brother and I looked at each other and chuckled. Newt pointed to what he said were two nice bucks straight ahead. He said they were about 250 yards away and staring right at us. We looked hard through our scopes and couldn't see any deer. Obviously the old fellow was pulling our leg!

He leaned over the hood and shot. We still didn't see the deer until we all walked up and were about 30 yards away. It was a huge 6x6. Never again did I underestimate those old guys who hunt the wide-open coulees and sagebrush desert.

R W Schwend
Boise, ID

TOM DICKSON

"Cindy and I love the outdoors—except for the part where you actually go outdoors."

LET'S HEAR IT

FWP is sometimes accused of not listening to the public. We're trying to change that. One way has been to improve our hunting season–setting procedure. We understand that hunting seasons are as much about the public's values, desires, and opinions as they are about biology. So we're making it easier for hunters and others to participate in the process and voice their preferences.

This past fall, for the first time, FWP solicited public comments and suggestions on hunting seasons before making recommendations to the FWP Commission. We received more than 300 comments, mostly from hunters. Some were specific: "Return to either-sex elk in the first week of areas 121, 122, and 123," wrote one hunter. Others were less precise: "How about some muzzleloader-only seasons?" asked another. Many hunters recommended that we keep things as they are ("OK," "Leave the same," and "I feel the current season is good" were common responses). One kind-hearted hunter went so far as to write, "Keep up the good work!"

We can't make everyone happy. But we can listen to what the public says and seriously consider their proposals and concerns.

Some themes emerged: A number of hunters asked that the general big game season open on Saturday rather than the traditional Sunday. Many wanted expanded archery seasons. And many requested that hunters who successfully draw a limited elk permit be required to wait a few years before reapplying (as is the case with moose, bighorn sheep, and mountain goat permits).

What struck us most about the 300-plus comments was their overall sincerity. Most indicated that hunters thought carefully about their suggestions and weighed various options before making them. Changing a hunting season is serious business, and hunters responded accordingly.

In December the commission considered these and other comments, along with biennial hunting season recommendations from agency biologists, and tentatively adopted ones they deemed appropriate. FWP then conducted 46 public input meetings statewide and provided opportunities on the agency website to gather public comments on the commission's tentative regulations. Commission members then reviewed the second round of comments before making their final decisions in mid-February.

One popular request was to change the general big game season opener from Sunday to Saturday.

DENVERBRYAN.COM

Listening more closely to public concerns and suggestions does not mean we can do what everyone asks. Some recommendations would not fly with the general hunting public, such as one asking that Montana allow harvest of hen pheasants. And consider our dilemma when one hunter asks FWP to allow more sheep hunting opportunities in the Missouri Breaks while another recommends we restrict sheep hunting there. Who do we listen to? That's where science comes in, along with the judgment of biologists and commission members.

We can't make everyone happy. But we can listen to what the public says and seriously consider their proposals and concerns.

Fortunately, most hunters seem to know that FWP can't make every Montana hunting wish come true. One acknowledged as much with his comment on the bighorn sheep hunting season: "Would like to get drawn," he wrote.

Wouldn't we all.

—Joe Maurier, *Director, Montana Fish, Wildlife & Parks*

NATURAL WONDERS

ILLUSTRATION BY PETER GROSSHAUSER

Q. *Do fish feel pain from being hooked?*

A. Probably not. Fish are usually hooked in the mouth, which is composed of bone and skin with almost no nerve endings. But the main evidence against the pain theory is trout that have been hooked and released are often caught a few hours later on the same fly. That indicates the experience was likely not painful. However, measurements of elevated cortisol hormone levels in fish have shown that trout and other species experience physical stress when fighting for too long against an angler's line. That's why anglers who wish to release their fish should bring their catch to the net as quickly as possible.

Photographer **Rodney Schlecht** of Great Falls spotted these drake pintails in March at Freezout Lake. The prairie birds stage at the shallow basin for several weeks in early spring as they migrate from wintering grounds in southwestern states to breeding areas in Montana, the Dakotas, Canada, and Alaska. Schlecht says he likes photographing waterfowl flying across the Rocky Mountain Front "because it shows them in a wilder environment than the usual cattails and shallow ponds." In this shot, the challenge was to keep the speedy ducks in the frame with Castle Reef in the background. "It's hard to nail a good shot of pintails because they are so fast," he says. "But sometimes when they all turn in sequence they'll stall for just a moment, and that's when I was able to keep them in focus and get this shot." ■

RON BOGGS

Though definitely a trophy, this 9-pounder is just half the weight of Montana's heaviest sport-caught walleye, a 17.75-pound, 35-inch fish caught in Tiber Reservoir in 2007.

BREAK A RECORD THIS YEAR

You'll probably never break a world record by eating 68 hot dogs in ten minutes, as Californian Joey Chestnut did last summer at Nathan's Famous Fourth of July Hot Dog Eating Contest, held at Coney Island in New York.

But you could break a state or even a world game fish record. It happens all the time.

FWP keeps Montana's angling records; the two world angling record keepers are the International Game Fish Association (IGFA), in Florida, and the Freshwater Fishing Hall of Fame, in Wisconsin. (Both claim to be the "official" record-keeping authority.) The international organizations have dozens of line-class and fly rod tippet-class categories for each species, creating hundreds of opportunities for anglers to get their names in either group's record books.

Each year FWP certifies several new records. Dozens of names are added to the world record books annually. Earlier this year, the IGFA announced it had accepted Manabu Kurita's 22.25-pound largemouth bass, caught in July 2009 in Lake Biwa, Japan, as the all-tackle world record for that species. The Japanese angler's largemouth ties the hallowed record held for 77 years by George Perry for a bass caught in 1932 in Georgia. The game fish organization also announced it had approved a 41.44-pound brown trout caught by Tom Healy in September 2009 from Michigan's Manistee River as an all-tackle world record for that species.

Montana's oldest state record is for bull trout, a 25.63-pounder caught in 1916. The largest record is a 142.5-pound paddlefish that was legally snagged in the Missouri River in 1973. The smallest is a .01-pound, 3.43-inch-long emerald shiner caught at Fort Peck Lake's Park Grove Bridge in 2006. (Imagine that minnow mounted and displayed over the fireplace.)

Perhaps the most exalted Montana record is the 33.1-pound rainbow trout caught in the Kootenai River at David Thompson Bridge in 1997. The record least likely to be broken may be the white sturgeon (96 pounds, Kootenai River, 1968). Few of these prehistoric fish remain, and catches are rare.

Records also provide a way of comparing fish size in one state to another. Montana's smallmouth buffalo record of 38 pounds (Nelson Reservoir, 2007) is dwarfed by the Arkansas state (also the world) record of 82.19 pounds. But many Montana records hold up well to those in other states. Our record 3.18-pound goldeneye, for example, is not much smaller than the South Dakota (and world) record of 3.81 pounds.

Like many states, Montana keeps fish records for a wide range of species, not only those commonly caught by sport anglers. These include the rarely seen Utah chub, peamouth, and longnose sucker. Fisheries officials say the state's long list of record fish categories draws attention to species anglers might not otherwise know or care about.

For a list of Montana state record fish and rules on how to submit a potential record, visit fwp.mt.gov/fishing/guide/records/. For international angling records, go to freshwaterfishing.org or igfa.org.

Get the report

FWP's 2009 annual report is now available for anyone interested in how the department worked on fulfulling its mission to provide stewardship for the state's fish, wildlife, state parks, and recreational resources. The report breaks down agency revenue and expendirures and lists many new laws, projecrs, and programs affecting Montana's outdoors. A few of the fish, wildlife, and state park highlights in the agency's annual report:

- gray wolf delisting in Montana
- cooperative agreements be-

MONTANA FWP

View the FWP annual report on-line at fwp.mt.gov, or call (406) 444-2535 for a copy.

tween landowners and state and federal agencies to restore habitat on the Big Hole River
- Pictograph Cave State Park's new visitor center
- a record number of calls to the state's anti-poaching hotline (800-TIPMONT)
- the 2009 Montana legislature's bill that resolves bridge access controversies
- establishment of a new 12-member citizen council to work with FWP on upland game bird management.

That's just for starters. See the rest by viewing the report on-line at fwp.mt.gov, or ask for a printed copy by calling (406) 444-2535.

KENTON ROWE

Attendance at Pictograph Cave State Park doubled last year, while visitation at all 50 parks combined rose 13 percent.

Visitation at state parks on the rise

The ongoing recession may be curtailing excursions to Bali and St. Tropez, but it's certainly not hurting attendance at Montana state parks. Last year the parks posted a record 2 million visits, up 13 percent from 2008.

"Overall our visitor numbers have grown in five of the past six years," says Chas Van Genderen, Montana State Parks administrator. "Only in 2008, with those high gas prices, did we see a slight decrease."

Overnight camping at state parks also climbed, up 32 percent from the previous year, with more than 287,000 campers putting down stakes.

Why the rise in state park vacations, weekend getaways, and half-day trips? One reason, says Van Genderen, is that state parks are offering more camping opportunities and other services such as interpretive programs, showers, and group-use shelters. Another could be recent economic conditions. Montana residents—83 percent of state park visitors in 2009—may have cut back on vacations to Disneyland and Alaska and instead took affordable trips closer to home.

Montana's most visited state park was Giant Springs in Great Falls, with 301,575 visits. Next was Cooney, near Billings, with 143,012 visits. The seven parks along the shoreline of Flathead Lake had 233,224 visits combined. Among parks seeing the greatest attendance spikes were Pictograph Cave, up 95 percent, and Sluice Boxes, up 30 percent.

According to Van Genderen, state park visitors are not only increasing in number, but they are also reporting high levels of satisfaction. "Roughly 95 percent of visitors recently surveyed said their experience at a Montana state park was good or excellent," he says.

Learn about lions

It's common knowledge that Montana's mountain lions eat deer and elk. But did you know the large carnivores also hunt bighorn sheep, pronghorn antelope, beavers, rabbits, wild turkeys, and even porcupines?

Learn about mountain lion diet, mating, behavior, range, and more from FWP's new voluntary on-line Mountain Lion Identification Course.

Among other uses, the training program was created to help hunters determine whether a treed lion is a male or a female (a male has a black spot below its anus; the female does not). "Most hunters want to kill a male, which is larger and more of a trophy, but too often they don't know how to tell one from the other," explains Thomas Baumeister, supervisor of the FWP Education Section. He adds that reducing the harvest of adult females also decreases lion kitten mortality caused by orphaning. "We're asking hunters, guides, outfitters, and houndsmen to learn the difference and then take the time to determine gender before taking a lion."

Anyone may take the on-line course at fwp.mt.gov/education/hunter/mountainLionID/.

D. LINNELL BLANK

Male or female? A new FWP on-line course has the answer.

Ice Fishing

GRUMPY OLD MEN In 1913, when this photograph of Georgetown Lake was taken, winter anglers had to use axes to chop holes and weights on strings to measure water depth. Little changed in ice fishing over the next 70 years until a slew of electronic gadgets and portable devices began appearing on the market and revolutionized the sport.

MONTANA HISTORICAL SOCIETY RESEARCH CENTER PHOTOGRAPH ARCHIVES, HELENA, MT

GETS CIVILIZED

Electronic fish locators, portable ice houses, and other technological advances are making this once-brutal winter sport downright enjoyable. By Tom Dickson

Ice angler Keith Kitchel is catching some rays this sunny late-winter afternoon on Canyon Ferry Reservoir, but not much else. The six rods propped over holes scattered around him haven't twitched all day. "I don't know why," says the 82-year-old Belgrade resident. "Last week we had our limits by noon, but today I haven't caught a single thing."

OLD SCHOOL Keith Kitchel of Belgrade waits for bites while ice fishing on Canyon Ferry Reservoir. Except for his power auger, the 82-year-old angler prefers fishing with homemade gear. "When the fish aren't biting, it doesn't seem to matter what you do, and when they are biting, it seems you can put about anything down the hole and they'll take it," he says.

Kitchel is fishing for rainbow trout using small lead-headed jigs tipped with maggots—standard ice-fishing fare. Except for a power auger, his unsophisticated gear is not much different from what ice anglers were using 30 years ago. For shelter from the wind he sits in an old pickup camper his son drives out onto the ice each season. To keep from slipping, Kitchel twisted sheetrock screws into the soles of old boots then cut off the heads, leaving sharp shafts. He checks water depth by clipping a 2-ounce lead weight to his line and lowering it down the hole. His rods are made from old castoffs he buys at garage sales. He attaches pieces of orange-painted cork to the line to indicate bites. So he doesn't have to bend over to pull fish up from the hole, Kitchel made a gaff by attaching two large hooks to a golf club shaft with black electrician's tape.

There aren't many ice fishermen like Kitchel anymore. Today's hard-water anglers are far more likely to use expensive electronic gadgets than garage workshop contraptions. Over the past two decades, ice fishing has transformed into a high-tech, gear-laden recreational enterprise, complete with specialized strategies, technological innovations, tournament circuits, and even celebrities. Though the revolution may have taken some of the romance and adventure out of ice fishing, it has made the sport more comfortable, productive, and fun for more people. "It's not the brutal endurance test it was 20 years ago," says Jim Vashro, FWP northwestern region fisheries manager and an avid ice angler. "We're definitely seeing more people than ever out on lakes in winter, and a lot more kids and families."

The original ice anglers were actually fish spearers. Before European settlement, Indians in the Great Lakes region chipped holes in the ice. They waited under light-blocking shelters, often for days, until a fish swam up to a wooden decoy twirled enticingly beneath the ice surface.

Early 20th-century ice-fishing techniques and equipment were hardly more comfortable. A 1920 article on ice fishing in *Western Magazine* advocated using a "good axe" for chopping a hole and, for shelter, building a fish house "out of odds and ends of lumber, corrugated iron, sheet iron and tin, tarpaper, or manufactured paper substitutes." The author called this junk pile a "cozy . . . little shelter in which to indulge in winter fishing."

For much of ice-fishing history, equipment was as spartan as the frozen lakes where it was used. Anglers made rods from a cut willow or a dowel and wrapped their line around two golf tees glued into holes in the side. The Beaver Dam Tip-up, developed in the 1930s, and the Lewandoski Rattle Reel, which made a commotion to wake napping anglers when a fish took the bait, were the extent of ice angler ingenuity. Like so many anglers, Michigan outdoors writer Steven Griffin jerry-rigged equipment in his garage. In *Ice Fishing: Methods and Magic*, he recommended "building a rod from the whippy post that holds bicycle safety flags." Acknowledging the sport's endless periods of inaction, Griffin devoted an entire chapter to staying amused when fish aren't biting. "Why not try counting the minnows in your minnow bucket?" he advised.

Traditional methods of ice fishing had

Actually catch
point of what
fraternal bond

Tom Dickson is editor of Montana Outdoors.

NEW SCHOOL Portable fish houses have revolutionized ice fishing, allowing anglers to stay warm while moving around reservoirs like Pishkun (above left) until they find fish. Power ice augers let anglers drill dozens of holes in the time it once took someone with a hand auger—or even more tedious, a spud—to cut a single opening. Above right: Dave Genz, the godfather of modern ice fishing, revolutionized the sport with his "run-and-gun" approach, developed when he was a restless kid fishing with his dad.

severe limitations. In summer, an angler can cover thousands of cubic feet of water per hour by repetitively casting a lure or fly in different spots. But with traditional ice fishing, an angler lowered a lure or bait down a hole and then waited while hoping a fish—often lethargic because cold temperatures slow metabolism—swam close enough to see and then take the offering.

As a result of the bleak, stationary nature of traditional ice fishing, few people took the activity seriously. It was jowly Walter Matthau, after all, not hunky Brad Pitt who was cast as ice fishing's archetype in *Grumpy Old Men*—a retired TV repairman sitting in a lawn chair with a six-pack cooling in the ice hole. Winter fishing was for playing pinochle in shanties, listening to sports on a staticky radio, or just escaping domesticity in midwinter. Actually catching a fish was often beside the point of what was essentially an exercise in fraternal bonding or existential pondering. But in today's ice-fishing world, catching fish is precisely the point.

Ice anglers these days take matters into their own hands. If they don't catch something after a few minutes, they race to another spot. This "run-and-gun" approach was mastered by Minnesota angler Dave Genz, known as "Mr. Ice Fishing" for popularizing many of the sport's new techniques and gear.

Genz, 62, grew up ice fishing with his dad. "I'd get bored sitting in one spot," he says, "so I'd drill a new hole, and if I didn't catch anything, I'd drill more holes until I started catching fish. Pretty soon I figured out that you could catch more fish by moving around."

In the 1980s, Genz and other innovators developed the portable fish house. These durable pop-up tents, which seat from one to six anglers, feature a plastic or wood floor and aluminum or steel frames that support canvas or nylon material. Genz says it takes him less than a minute to set up his solo tent, which he pulls in a sled behind his snowmobile.

Also essential to modern ice angling is the power auger, a gigantic drill bit attached to a small engine. For decades the devices, invented in the early 1950s, were either too heavy or too expensive to be popular. Now many ice anglers own a lightweight electric or gas-powered model (some with quiet four-stroke motors), which can bore 8-inch-diameter holes through a foot of ice in seconds.

Making winter life even easier are garments of breathable, waterproof fabrics such as Gore-Tex as well as Thinsulate and other lightweight insulation that stays warm even when wet. A few years ago I met the legendary Genz in person as he was preparing to fish a qualifying tournament for the sport's Super Bowl: the North American Ice Fishing Championship. While I was shivering in below-zero temperatures wearing my ordinary winter jacket and hat, Genz appeared snug as a polar bear in his custom-designed weatherproof coveralls, which featured insulated kneepads and seat pad,

ng a fish was often beside the
was essentially an exercise in
ng or existential pondering.

FROZEN FUN No matter how basic or sophisticated their gear, ice anglers seem to have a good time just being outdoors on frozen water. Clockwise from top left: yellow perch caught from a portable fish house; northern pike taken on a lead-headed jig; single perch on display; skimming slush; drilling holes.

CLOCKWISE FROM TOP LEFT: BERT GILDART; JEREMIE HOLLMAN; CRAIG & LIZ LARCOM; WILDWESTPHOTOS.COM; ROBERT VAN POOLE

UNDER-ICE EXPLORATION One of the great mysteries of ice fishing is: What's under there? Anglers now can deploy battery-powered sonar devices to monitor depth and bottom structure (above left, Lake Mary Ronan). Or they can use an underwater camera (Lake Frances, above right) to actually "see fish and work your lure down to them," says Matt Straw, editor of *In-Fisherman* magazine.

wind-impermeable hood, and oversized pockets for holding gear. "I call it a fish house you can wear," he said.

The biggest ice-fishing innovations have been electronic, particularly the portable depth finders that locate fish, determine depth, and even show if the lake bottom is soft or hard. Invented in the 1970s, the devices "changed everything," says Matt Straw, editor of *In-Fisherman* magazine and an ice-fishing expert. "Suddenly you were able to see suspended fish, when before you pretty much had to fish on the bottom." Powered by lightweight, rechargeable gel-cell batteries, these modern sonar "flashers" operate by bouncing sound waves off the lake bottom (or fish). The sound waves return and show up as displays on a screen, allowing anglers to see their bait, line, and fish far beneath the ice.

Adding to the electronic arsenal are underwater cameras, which allow anglers to see how fish react to different presentations. When fish delicately ingest a bait, as they often do in cold water, the angler can see exactly when to set the hook. "That has definitely been the biggest revolution in recent years," says Straw. "Now you can actually look down and see fish hidden between rocks and work your lure right to them."

Another space-age marvel is the GPS (Global Positioning System) receiver, which finds and records precise locations on lakes. With a GPS unit programmed with precise waypoints, an angler can cross a barren expanse of ice and drill holes directly over points, bars, mudflats, and other previously located fish-holding structures. Says Genz, "There are no secret spots anymore."

Manufacturers offer winter anglers a dazzling array of clothing, shelter, and equipment. Sensitive graphite rods detect even the most delicate nibble. Special undersized spinning reels are spooled with copolymer line that remains soft in temperatures down to minus 40° F or fluorocarbon lines nearly invisible to fish. Anglers can tie on teardrop lures, ice flies, jigging minnows, and blade baits that come in dozens of colors and sizes. Some lures dipped in phosphorescent paint actually glow in the dark water after being "ignited" with a special flashlight.

Such innovation has made ice fishing more productive and more comfortable, attracting anglers who never before would

JEREMIE HOLLMAN

Where to see and experience ice fishing

You can find frozen-water angling opportunities on most Montana lakes. Top ice-fishing waters west of the Continental Divide: Georgetown, frozen bays of Flathead (the whole lake rarely freezes completely), Mary Ronan, Upper Thompson, Murphy, McGregor, Salmon, Holland, Placid, Smith, Lower Stillwater, Little Bitterroot, and Clark Canyon. Top waters east of the divide: Canyon Ferry, Holter, Hauser, Fresno, Tiber, Nelson, and Fort Peck. Web pages containing basic ice-fishing instruction and safety tips:

- wintermt.com/other/icefishing.htm
- anglerguide.com/articles/517.html
- fwp.mt.gov/education/angler/goFishing/icePrimer.html

have considered spending a day staring at a hole in the ice. "I think the new technology is especially attractive to kids," Vashro says. "They are more video oriented, and with flashers and underwater cameras you've got brightly colored lights and things moving on a screen. It gives a kid confidence that there actually is something down there."

Hard-water angling is particularly popular in lake-rich northwestern Montana. "Fish are especially firm and good tasting this time of year, and sometimes the catch rates through the ice are greater than in summer," says Vashro. "People without boats can get out over perch and kokanee—our two most popular species—which they can't do in summer." Vashro adds that the social aspect of ice fishing is part of the sport's appeal. "You'll have dozens of people in a small area with augers and snow machines buzzing, kids yelling and playing, and fishermen strolling around to see how the neighbors are doing," he says. "It's a great cure for cabin fever."

According to FWP records, up to half the annual fishing pressure on some northwestern lakes comes during winter. Vashro says that even with the string of warm winters throughout much of the last decade, annual ice-fishing pressure in his region increased 40 percent. "I get complaints from summer anglers about winter anglers and from winter anglers about summer anglers—that we should put additional limitations on one or the other—but I just manage our fishing lakes for use as a whole," he says.

Vashro, who first started ice fishing on Georgetown Lake in the mid-1970s, has lived through most of the sport's major technological changes. He says for years he wore mostly military surplus clothing and muscled a hole through thick ice with an old T-handled auger. "For a fish finder, I'd lay on the ice and look down the hole to see if anything was near my lure," he says. "Now I've got a half-dozen special ice-fishing outfits. I use neoprene gloves and other clothing specially designed for ice fishing. I use a flasher to zero in on fish and sometimes underwater lights to improve my catch rates. Instead of having to borrow a kid's sled like before, now I can haul all my junk across the ice in a special sled with high sides and compartments made just for ice fishing."

Kitchel has seen all the high-tech, specialized ice-fishing equipment in sporting goods stores and catalogs. As he skims slush off a hole with a skimmer he has duct-taped to a cane so he doesn't have to kneel down, he tells me he's not interested in replacing any of his rustic gear. To his way of thinking, it wouldn't help one bit. "When the fish aren't biting, it doesn't seem to matter what you do," he says, "and when they are biting, it seems you can put about anything down the hole and they'll take it."

But even this old-school angler can't completely escape technological advances. As we're sitting on the bleak, frozen expanse of Canyon Ferry, the silence is broken by a musical ditty emanating from his overalls. Kitchel fishes out a cell phone and says, a tad embarrassed, "It's my wife. She makes me bring it with me whenever I'm out here on my own."

Late-season ice fishing can be productive as fish move up into shallows and downright comfortable as temperatures warm. But winter fishing also grows more dangerous as ice melts, thins, and weakens. See the websites on page 14 for advice on ice safety.

OLD RELIABLE Despite the technological advances in electronics, rods, and lines, no one has come up with a device more durable or reliable than the old-fashioned tip-up, which triggers a waving flag when a fish takes the bait.

JEREMIE HOLLMAN

FOLLOWING THE GREAT FLOODS

When Glacial Lake Missoula exploded through an ice age dam, the deluge flooded much of the Pacific Northwest. Evidence of that cataclysmic event is still visible in parts of western Montana. BY BECKY LOMAX

HALF MILE TALL During the last ice age, a glacial lobe crept down from Canada into the Idaho Panhandle and blocked the Clark Fork River's westward flow. The 2,500-foot-high dam created a massive lake covering much of what is today western Montana.

ILLUSTRATION BY STEVE K. JOHNSON

THE GREAT WALL OF WATER When the ice dam broke, 500 cubic miles of water was forced between tall cliffs, causing the torrent to gush as if sprayed from a nozzle.

STEVE W. JOHNSON

Fifteen thousand years ago, a torrent of water—ten times the flow of all the world's current rivers combined—rampaged across the Pacific Northwest. The source, Glacial Lake Missoula, disgorged a tumultuous flood from today's western Montana when a glacial dam gave way.

A volume of water equal to Lakes Erie and Ontario combined tore its way west at 65 miles per hour, gouging out canyons, dropping house-sized boulders, piling up mile-long sandbars, and eventually spewing debris for miles into the Pacific Ocean.

That catasttophic ice age flood and others afterward left remnants and signs of their existence across the Northwest. In western Montana, visitors can see massive boulders stranded on open plains, hillsides scarred from floodwatet debris, ripple marks so big they're visible from space, and gaping potholes gouged by the swirling torrents.

In 2009, Congress recognized the unique effect of the great floods on the four-state landscape by establishing the Ice Age Floods National Geologic Trail. The geologic trail, the nation's first, is not a hiking path but rather a route along existing highways across the four-state region where visitors can see evidence of the great floods.

Becky Lomax, a writer in Whitefish, is a frequent contributor to Montana Outdoors.

LIKE WATER FROM A NOZZLE

From 15,000 to 20,000 years ago, fingers of the Cordilleran ice sheet that covered Canada crept southward across the 49th parallel. One massive glacial lobe inched south into the Idaho Panhandle through the Purcell Trench and eventually blocked the westward path of the Clark Fork River. The 2,500-foot-tall ice dam forced water back up into northwestern Montana valleys, producing a massive lake of long fjord-like inlets.

As water deepened behind the dam, pressure built until eventually the ice formation burst. During the next several days, 500 cubic miles of water was forced between tall cliffs 1.5 miles apart, shooting out of the narrow opening as if sprayed from a nozzle. The cataclysmic flood—estimated to be 60 times the flow of the Amazon River—spewed glacial debris and torrential waters more than 400 miles westward to the Pacific Ocean. Floodwaters tore across eastern Washington, chewing black basalt bedrock into a tangle of channels, canyons, and gorges found today in the Palouse River and Grand Coulee Canyon. Thundering water laden with ice, boulders, and topsoil sheared walls of the Columbia Gorge into vertical cliffs. As floodwaters drained from Washington and Oregon, they deposited boulders weighing up to 40 tons in the Willamette Valley. Mile-long bars of coarse gravel piled up around Portland.

This geologic devastation happened more than once. As new glacial fingers spread south and blocked the Clark Fork, Glacial Lake Missoula reformed then flooded again at least twice, according to Marc Hendrix, a University of Montana (UM) geology professor. "But exactly how many more times, we don't know," he says.

That's not the only mystery geologists are trying to solve. Evidence along the Flathead River indicates that Glacial Lake Missoula existed for roughly 3,700 years but doesn't reveal the date. "We don't know exactly when Glacial Lake Missoula existed because very little organic carbon was preserved in the lake," says Hendrix. "Without this information, it's difficult to reconstruct its history

LUKE DUBAY/MONTANA OUTDOORS

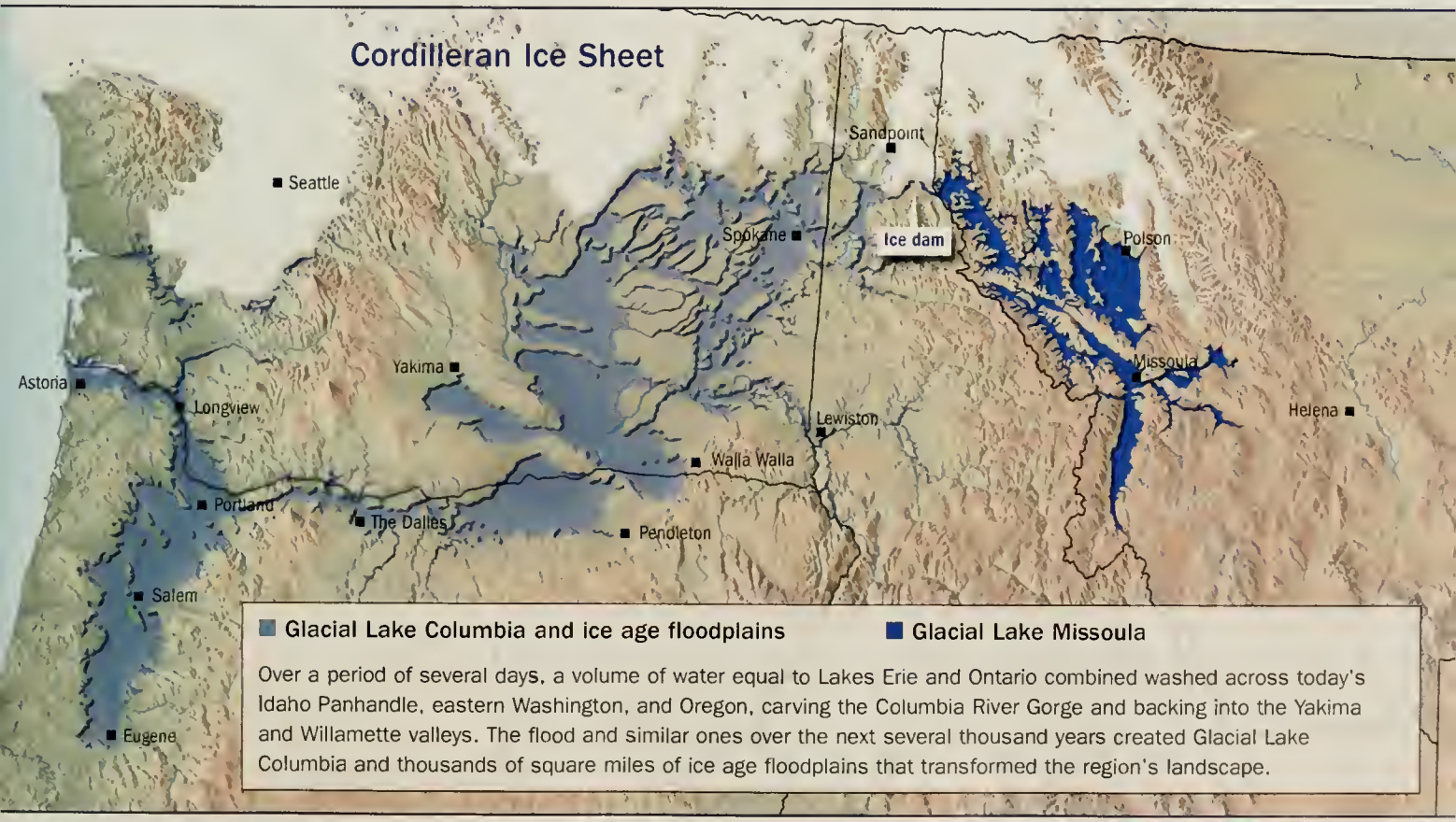
through geologic time." Another puzzle is the ice dam. "No one has been able to demonstrate whether it failed from wholesale collapse or from a slower, tunneling-based release of water," says Hendrix. "It really depends on how fast the glacier advanced and the balance between the erosive effects of summer river water flowing under the glacier versus the ability of the glacier to self-heal by surging forward and closing off sub-glacial tunnels."

Despite uncertainties over some aspects of the ice age lake and dam, geologists agree that Glacial Lake Missoula gave birth to some of the world's biggest floods. Its discovery allowed geologists to recognize the "signatures" of great flood sites elsewhere. Research from the Montana-based events has even provided geologists with evidence to help determine that catastrophic floods created the giant ripple marks and outwash fans on Mars, says Jim Shelden, president of the Glacial Lake Missoula Chapter of the Ice Age Floods Institute.

As stipulated in last year's Ice Age Floods Bill, the National Park Service oversees the trail from its Seattle offices, but communities in Washington, Oregon, Idaho, and Montana will operate individual interpretive stops. "The trail concept was sold all the way to Congress as being largely under local control, so that small communities would benefit," says Shelden. "The idea was that the trail adds something that would make a tourist buy a steak in town or stay a night." The Washington-based Ice Age Floods Institute, which has been guiding public field trips over the last decade, has jumpstarted the process by establishing interpretive exhibits at roadsides, visitor centers, and museums along the route.

Because the trail begins in western Montana, Shelden and others see Missoula as a natural starting point. The institute helps maintain a display in the Montana Natural History Center there, but Shelden and others hope a full-blown Ice Age Floods Trail visitor center can be built someday. According to the UM's Small Business Institute, a center would generate between $733,000 and $3.9 million each year for Missoula from tourism. Other Montana communities such as Polson—as well as Lewiston (Idaho); Ellensburg, Yakima, and Spokane (Washington); and Eugene and Astoria (Oregon)—will benefit economically from trail tourism. Though Congress has yet to appropriate funds for interpretive kiosks, signage, education programs, or other floods trail management, visitors today can see many remnants of the land-altering events on their own.

Floods tore across Washington, chewing basalt bedrock into a tangle of channels, canyons, and gorges. Thundering water laden with ice, boulders, and topsoil sheared the walls of the Columbia Gorge into vertical cliffs.



Over a period of several days, a volume of water equal to Lakes Erie and Ontario combined washed across today's Idaho Panhandle, eastern Washington, and Oregon, carving the Columbia River Gorge and backing into the Yakima and Willamette valleys. The flood and similar ones over the next several thousand years created Glacial Lake Columbia and thousands of square miles of ice age floodplains that transformed the region's landscape.

LITTERED WITH PROOF

Signs of the ice age lake and floods are scattered across northwestern Montana. "We're lucky to have all these sites right here in our backyard," says Hendrix. Like rings in a bathtub, Glacial Lake Missoula left proof of its existence in strandlines—horizontal terraces created by varying lake levels. These are most evident on the grassy slopes of mountains around Missoula, particularly Mount Jumbo and Mount Sentinel. The strandlines also appear along the U.S. Highway 93 corridor north to St. Ignatius. While hard to distinguish during some seasons, they become pronounced when highlighted by fresh or melting snow.

NORMAN & MADRINE JACOBSON

JIM STREETER

MOUNTAINS OF EVIDENCE When the ice dam broke, some floodwaters tore through Hellgate Canyon (above), a mile east of Missoula. The canyon is flanked by Mount Jumbo and Mount Sentinel, both of which show terracing caused by varying floodwater levels. Right: Dark and light layers of clay silt deposited by the glacial lake are today visible near Ninemile. Below: Earthen ripple marks resembling large waves were left by racing floodwaters in Camas Prairie south of Hot Springs.

BECKY LOMAX

The torrents also pried boulders loose and plopped them in places where they now sit alien amid surrounding native geology. Angular boulders—some weighing several tons—are strewn across the UM campus. One boulder plucked from the walls of Hellgate Canyon, 1 mile east of the university, protrudes 5 feet above the grass in the campus area known as The Oval.

Floodwaters also left ripple marks—huge undulating, wavelike patterns in the ground. South of Hot Springs, giant grass-covered ripples of silt crest up to 35 feet high. The earthen waves also run perpendicular to State Route 382 through Camas Prairie. The massive ripples, big enough to be visible on Google Earth, formed the primary evidence in 1942 for geologist J.T. Pardee to infer that Glacial Lake Missoula emptied rapidly.

Montana also holds evidence of a kolk—a tiranic whirlpool that can grind a lake bed out of bedrock. When the floodwaters collided, they created a violent vortex that dug up rock chunks and flung them into the torrent. Southwest of Hot Springs on Montana Highway 28, a kolk augured the 1.5-mile-long Rainbow Lake from bedrock. Also known as Dog Lake, the basin sits in a depression with no inlet or outlet. Rocks chewed from the basin landed several miles away along the road toward Plains.

Much of Glacial Lake Missoula drained through the Clark Fork River channel. Like those in smaller rivers, the floodwaters amassed stones into gravel bars and sheared rock to form steep-walled canyons. West of Missoula at Tarkio, look for a 1.5-mile-long gravel bar several hundred feet high, full of rounded rocks the size of softballs and footballs. Farther downstream, between Plains and Thompson Falls, the Clark Fork squeezes through the rugged vertical-walled canyon of Eddy Narrows. The sheer rock cliffs, scraped free of topsoil by gushing torrents, are witness to the floodwaters' enormous power.

Humans did not reach the Pacific Northwest from Alaska and Canada for several thousand years after the great floods swept across the region. As a result, no pictographs, legends, or other cultural evidence of the geologic events exist. But the floods themselves left ample evidence of their passing. Over a single weekend (see sidebar below), Montanans and visitors can see stark reminders of what nature can do when the right climatic conditions combine.

Learn more at the Ice Age Floods Institute's website, iafi.org, or at the Montana Natural History Center's Glacial Lake Missoula website, glaciallakemissoula.org. Or pick up a copy of Glacial Lake Missoula and Its Humongous Floods, *a lively history of the geologic event by UM geology professor David Alt (Mountain Press Publishing Co., 2001).*

BECKY LOMAX

Interpretive panels tell the ice dam story at the Cabinet Gorge Dam Viewing Area.

A self-guided weekend tour of the ice age floods

By Becky Lomax

To see some of the most dramatic flood features, take this weekend driving tour—complete with camping at three state parks:

1 Salmon Lake to Big Arm

Both Salmon Lake and Big Arm state parks sat under hundreds of feet of ice when Glacial Lake Missoula existed. A tour between them leads through the ancient lake bed. From Salmon Lake (about 25 miles east of Missoula), follow Montana Highway 200 toward Bonner and then take I-90 to Missoula. One mile before the freeway reaches the city, you'll drive through the tight bottleneck of Hellgate Canyon—the narrowest point in the floodwaters' route to the Pacific Ocean. Raging waters scoured the south wall of the canyon, ripping out boulders and flinging them into the Missoula Valley up to a half mile from the canyon's mouth.

In Missoula, visit the Montana Natural History Center for an overview—including maps, photos, and a 14-minute video—of the Ice Age Floods National Geologic Trail. Then head to The University of Montana to see boulders embedded in The Oval. Ambitious visitors can climb the 17 switchbacks through the glacial lake's strandline terraces on Mount Sentinel to the iconic "M."

From Missoula, consider an optional 80-mile round-trip that takes you toward Idaho on I-90. One-half mile west of exit 82, look along either side of the freeway to see exposed bands of fine dark clays alternating with light-colored silt—evidence of Glacial Lake Missoula's existence. Between mileposts 61 and 62, the enormous Tarkio gravel bar is revealed, though only a portion is visible along the freeway. Take exit 61 and drive halfway down to the Tarkio Fishing Access Site. Look back to grasp the full scale of the forest-covered geologic residue.

As you head north to Flathead Lake's Big Arm State Park from Missoula on U.S. Highway 93, take a brief detour to the National Bison Range. After reaching the summit of the 19-mile Red Sleep Mountain Drive, look for the Glacial Lake Missoula Interpretive Site on the road's north side. The site sits 150 feet above the lake's highest level. The 30-mile-long expanse of the Mission Valley below is just one finger of the massive glacial lake.

2 Big Arm to Thompson Falls

From Elmo, head south toward Rainbow Lake, 7 miles southwest of Hot Springs on Montana Highway 28. Turn right onto a dirt road swinging west. Park, then climb the dark rocks to view the lake, which was drilled out by a floodwater vortex. Retrace your route along the highway back toward Hot Springs, turning south onto State Route 382 to see giant ripple marks across the Camas Prairie.

From Perma or Plains, head northwest on Montana Highway 200 toward Thompson Falls. Between mileposts 59 and 60, stop at the KooKooSint Sheep Viewing Interpretive Site in the Eddy Narrows to see where the ice age floods swept away topsoil and created the vertical canyon walls.

KEVIN L. MAX

AUGERED OUT Rainbow Lake was created when a powerful vortex of glacial floodwater drilled the basin out of bedrock.

3 Thompson Falls to Idaho border

After camping at Thompson Falls State Park, which would have been buried by 2,000 feet of water from Glacial Lake Missoula, visit the site of the ice dam. Turn off Montana Highway 200 at milepost 62.9 to reach the Cabinet Gorge Dam Viewing Area, which is just over the border in Idaho. Interpretive panels point out the height of the ice dam on the opposite mountains. ■

LIBBY LAHAM / MONTANA OUTDOORS

Montana State Parks
(406) 752-5501, fwp.mt.gov

Montana Natural History Center
(406) 327-0405

National Bison Range
(406) 644-2211
fws.gov/bisonrange/nbr/

A STEADY FIRST STEP

What Montana learned from its first regulated wolf hunting season

BY TOM DICKSON

When George Killebrew aimed his rifle at an approaching wolf the morning of October 27, 2009, he didn't know whether he would shoot. "I had real mixed feelings about killing a wolf," says the Hamilton electrician, who has been hunting in the Bitterroot Valley since moving there 12 years ago. "Part of me sees the wolf as a sacred animal. But I also think there are too many of them."

Killebrew was hunting south of Darby when the wolf emerged from the forest and began moving toward where he sat hidden in a field. He'd been looking for elk since early September—first with his bow and now with a rifle in the general big game season—and had not encountered a single one. "Every year I see lots of elk, and I always get one," he says. "Not this year. But I saw a lot of wolf tracks, more than ever." Killebrew had purchased a wolf license, but he wasn't sure he would use it, even as the wolf drew closer from across the field. "I'm the kind of person who was glad they reintroduced wolves, because I like things to be as wild as possible," he says.

CONSTANT MONITORING

A total of 72 of the 15,603 hunters who bought a wolf license were successful last year in Montana's first regulated wolf hunt. The season opened September 15 in backcountry areas and continued with the general big game season, which began October 25. State wildlife officials closed the wolf season three weeks later, on November 16, when hunters were nearing the quota of 75 set by the FWP Commission the previous summer.

Ken McDonald, FWP Wildlife chief, says not exceeding the quota was one indication Montana can effectively manage and administer a wolf hunting season. In addition, no more than four wolves were taken from any one pack, and the harvest was well distributed across the three wolf management units. "Those results are important for maintaining a healthy and viable wolf population in Montana," says McDonald. "We've said all along that that is the state's goal, even as we go forward with public hunting seasons."

According to Carolyn Sime, FWP statewide wolf coordinator, the agency kept close tabs on the wolf harvest using the same computer-based quota tracking system it employs for other species that have harvest quotas, such as mountain lions, bobcats, and furbearers. FWP required successful wolf hunters to report their kill within 12 hours so that biologists could closely monitor harvest in each wolf management unit. Hunters were also required to bring their wolf to an FWP office within ten days of harvesting the animal. Agency staff collected biological information from each wolf to determine the animal's age, sex, reproductive status, weight, color, and, in most cases, which pack it belonged to.

Another revelation from the inaugural season was that hunters can successfully harvest wolves. "We really didn't know how it would work out, because there never had been a regulated wolf hunting season in the lower 48 states," says McDonald. "We knew that hunters see wolves while out hunting deer and elk, but there was some doubt about how effective they would be hunting wolves."

Though the quota was lower than what many hunters wanted, Montana's first wolf hunt appeared to reduce animosity toward the carnivores. "We expected that hunters' attitudes toward wolves would change once they had a wolf tag in their pocket, and that's what happened," says Jim Williams, FWP regional wildlife manager in Kalispell. "In 2008 we had complaints about wolves all season long. But last year during the first three

"This first hunt was a learning experience. We really didn't know how it would work out, because there never had been a wolf season in the lower 48 states."

GATHERING INFORMATION As it does with other harvested game animals, FWP staff members collected biological data from wolves taken by hunters during Montana's first regulated wolf hunting season.

ADRIENNE HOWE

weeks of the big game season, when wolves were legal, we heard almost nothing in the way of complaints from hunters. When we closed the season, complaints started up again."

Quentin Kujala, FWP Wildlife Management Section supervisor, says hunters are more likely to tolerate carnivores they can hunt and may even become advocates for the species. "That's been the case with lions and black bears, and we believe it will happen with wolves, where you'll have some hunters pushing for wolf conservation like they do for other large carnivores that offer hunting opportunities," he says.

That's one reason many state and national conservation groups such as the Rocky Mountain Elk Foundation support a regulated wolf hunting season. Another is that they agree with Montana and the U.S. Fish & Wildlife Service (USFWS) that the Rocky Mountain gray wolf population has fully recovered. The population reached the federal recovery goal in 2002 and has been growing since. In 2009, the USFWS delisted the wolf in Montana and Idaho, allowing the two states to proceed with state management plans that include regulated hunting seasons.

Montana wildlife officials say the hunt was necessary not only to manage the population but also because numbers had grown to the point where public support for wolves in Montana was eroding. "When there are too many of any wildlife species, you can start having problems and there has to be some population management," says McDonald. "The best way for that has always been with regulated public hunting. We want to keep Montana's wolf population healthy, but we also need to retain a reasonable balance of wolves, other wildlife, and human values."

MONTANA'S FIRST REGULATED WOLF SEASON

Licenses and hunters

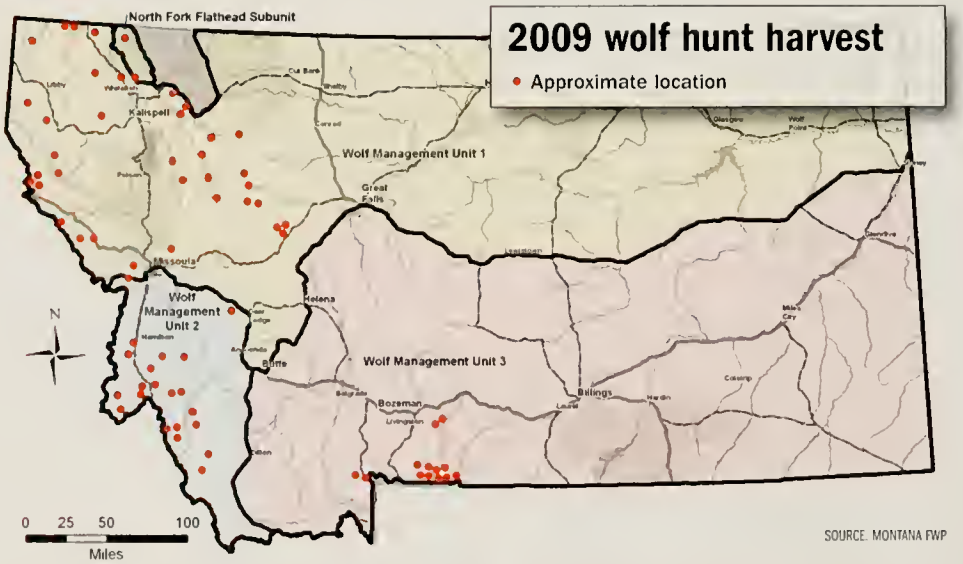
- 15,603 licenses purchased (15,514 residents, 89 nonresidents)
- 12% of Montana resident elk hunters bought a wolf license in 2009
- license cost: $19 (resident), $350 (nonresident)
- total license revenue: $325,916
- 69 of 72 successful wolf hunters were Montana residents

Wolf age and sex

- 27 adults: 38% of total harvest
- 22 yearlings: 31% of total harvest
- 22 juveniles: 31% of total harvest
- 1 age unknown
- 41 males, 31 females

Average weight

- adults: 97 pounds (largest: 117 pounds)
- yearlings: 80 pounds
- juveniles: 62 pounds



SOURCE: MONTANA FWP

SOME ARGUE: TOO SOON

But some groups, like the Natural Resources Defense Council and Defenders of Wildlife, say it's too soon for hunters to target a species only recently removed from the endangered species list. The environmental organizations maintain that Montana and Idaho should wait until wolf populations are stronger before considering public hunting. Among their concerns is that wolf hunting might hamper wolf dispersal and reduce genetic connectivity among subpopulations of the three recovery zones (Greater Yellowstone Ecosystem, northwestern Montana, and central Idaho).

Federal and state biologists say genetic isolation is not currently a problem and appears improbable in the future because wolves are so mobile. McDonald notes that wolves regularly disperse, sometimes over long distances. Wolves have been tracked traveling 30 to 50 miles in a day and 500 miles in a year. One pack, near St. Regis, Montana, contains a wolf that originated from a pack near Boise, Idaho, about 250 miles away, McDonald says. What's more, researchers have documented broad genetic diversity in the current Northern Rockies wolf population. "We recognize that genetic connectivity is important for wildlife species, and we know that allowing wolves from the three recovery zones to intermix enables them to function as a single large population rather than three smaller, isolated populations," McDonald says. "But we don't see genetic diversity as a problem for our wolves at this time, and we don't expect it to become an issue in the future."

One criticism of the hunt is that it did not target "problem" wolves that prey on livestock. "Some thought FWP should direct hunters to areas with depredation problems, but others said most of the harvest should be in backcountry areas where big game hunters are," says McDonald. "We tried to distribute harvest across the landscape and manage the overall wolf population while providing hunting opportunity.

JAIME & LISA JOHNSON

RELEASE VALVE FWP maintains that having the opportunity to hunt wolves can build tolerance among hunters for keeping the carnivores in Montana. "That's been the case with lions and black bears, and we believe it will happen with wolves," says one agency official.

"Of course we hope wolf hunting will help reduce livestock depredation, and in the future we'll try to increase harvest in certain trouble spots," he adds. "But this first year we didn't intend to concentrate harvest on any one place, and instead we relied on hunter activity to spread the harvest across relatively large management units."

According to McDonald, wolves were killed from roughly ten packs that had a history of encounters with livestock or domestic dogs. "That suggests to us that hunting can help reduce wolf conflicts by reducing pack size in those areas, even if that's not the main objective of the season," he says.

Another complaint is that because most of the harvest took place during the September backcountry season in one wolf management unit, many general-season hunters didn't have an opportunity to hunt wolves. "We understand that concern," says McDonald. "And in the future we'll propose spreading out hunting opportunity to make it more equitable. Again, keep in mind that this was only Montana's first year of wolf hunting. It's still a learning experience for everyone involved."

KEEPING A HANDLE ON THINGS

As the wolf continued to draw to within 150 yards from where he waited in the Bitterroot Valley pasture, Killebrew made his decision and fired once, then again. "I don't like to kill something I'm not going to eat, but I feel like I did the right thing," he says, adding that the wolf pelt is being tanned by a local taxidermist. "I don't think we should ever kill something out of existence, but there are too many wolves out here. They're getting too brazen. Last year we had wolves kill a deer in our backyard, 6 feet from our back porch.

"I think we should have everything in the woods, from grizzlies on down," Killebrew adds. "But you can't have too many of one species. You have to manage all the wildlife and keep a handle on things for the good of all."

View the 2009 Montana Wolf Hunting Season Report on-line at fwp.mt.gov (look for "Montana Wolves" under "Fish and Wildlife" on the front page). Or request a copy by calling (406) 444-2535.

A 2010 HUNT?

The likelihood of a 2010 wolf hunt is uncertain. U.S. District Court Judge Donald Molloy in Missoula is currently considering a lawsuit that seeks to rescind the U.S. Fish & Wildlife Service's (USFWS) 2009 decision to delist wolves in all the Northern Rocky Mountain Recovery Area except Wyoming. The plaintiffs argue it is still too soon for wolves to be removed from federal protection. A decision is expected later this spring or summer.

Last year Judge Molloy denied a motion by the plaintiffs for an injunction to stop the 2009 wolf hunts in Montana and Idaho. But at the time he also indicated that the USFWS may have violated the federal Endangered Species Act when it dropped Wyoming from its decision to delist wolves elsewhere in the region. If true, that could mean wolves may need to be relisted under legal requirements of the ESA.

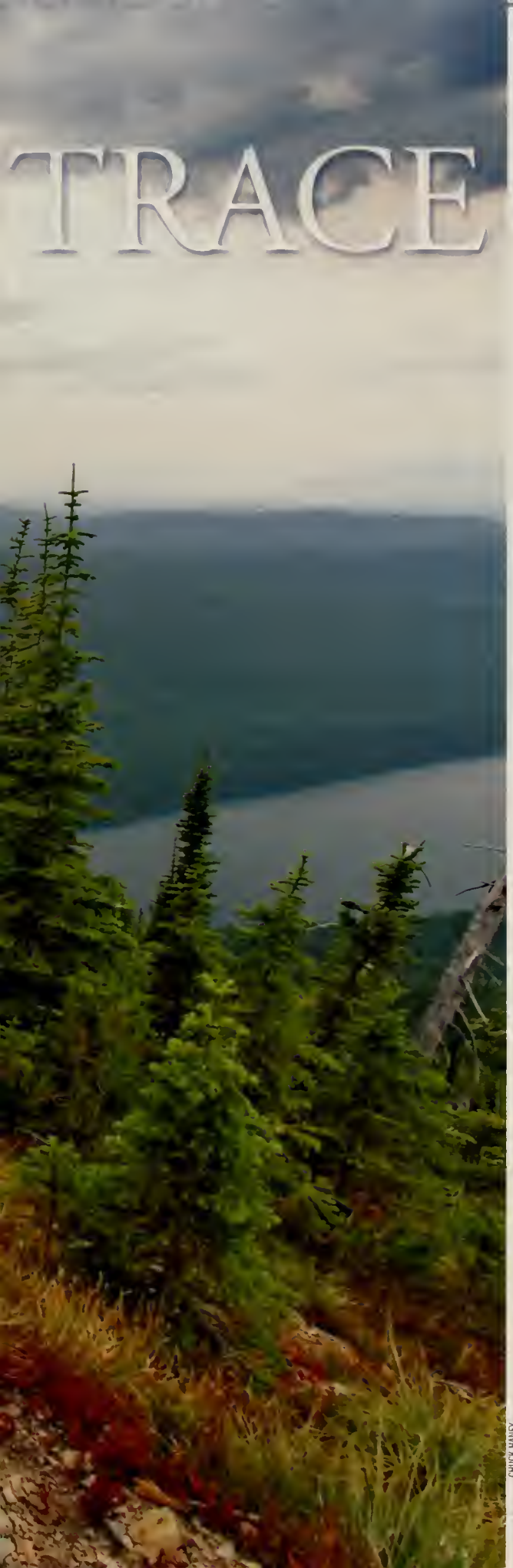
Montana officials support the USFWS delisting decision, agreeing with the federal agency that wolves are recovered and that the recovery requirement of genetic exchange among the three subpopulations has been and will continue to be met. They maintain that wolves should not be relisted in Montana and that keeping the species federally listed in Wyoming complies with the ESA. State officials also say Montana has proved it can manage wolves and that existing protective regulatory laws ensure wolf conservation will continue into the future.

FWP is preparing wolf hunting proposals for the 2010 and 2011 seasons, including season dates, quotas, and management units. Proposals approved by the FWP Commission will be available for public review and comment before any are formally adopted.

If the federal court orders wolves to be relisted, control would again—as it was before delisting—be guided by federal regulations, and hunting seasons may not be an option.

Montana has said it will continue to pursue all legal options to keep the recovered wolf population delisted.

ON THE RIGHT TRACK Backcountry hikers and backpackers quickly saw the value of the Leave No Trace program, which began in the 1960s in response to growing public use of national forests and wilderness areas.



CHUCK HANEY

TRACE FOR ALL

Backcountry hikers and backpackers have embraced this national ethics and education program. Will other outdoor recreationists follow suit?

BY BILL SCHNEIDER

I've been hiking for a long time, going back to the mid-1960s, covering thousands of miles of trails in national parks and wilderness areas. While logging those miles and writing 11 hiking guidebooks along the way, I saw something wonderful happen.

In the old days, I stayed in even better shape on hikes by carrying out backpacks full of trash. I don't mean a candy wrapper here or a discarded tissue there, but a mountain of aluminum foil, cast-off horseshoes, rusted cans, rope, spent cartridges, wire, and what seemed like a million cigarette butts. I also hauled old hiking boots, discarded tents, and cast-iron frying pans out of the backcountry. And I may have destroyed more fire rings than any person on earth.

Not these days. I now have to go to the gym for extra exercise. When I hike in the backcountry I can't even find a piece of dental floss or a shred of scorched foil in a fire ring—if I can even find a fire ring.

What happened? More than anything else, it has been the widespread acceptance of Leave No Trace (LNT), a program promoted by land and outdoor recreation management agencies in cooperation with the Leave No Trace Center for Outdoor Ethics. The no-trace ethic challenges all outdoors users, not only hikers, to leave as light a footprint as possible. >>

That means simple things like staying on trails if possible, properly disposing of waste, and not disturbing wildlife or conflicting with others also enjoying the outdoors.

Each individual user might have a tiny effect, but cumulative use, year after year and decade after decade, can add up to major damage. Impromptu trails around official routes erode into ugly scars, campsites start to resemble miniature garbage dumps, and campers hoping for peace and quiet can't find it.

LNT encourages everyone to reduce disturbances to the land and to others sharing the outdoors, today and for years to come. It's working, but not everyone who spends time outdoors has embraced the ethic—yet.

TOO MUCH TRACE It was once common for hikers and backpackers to widen trails, carve trees, and leave campfires filled with cans and other trash. Today such visual scars are largely absent from backcountry areas. Now Leave No Trace advocates are working with "frontcountry" campers, anglers, hunters, and other recreationists to similarly reduce signs of human presence by picking up fishing line, using fire pans, and packing out human waste from river campsites.

CLOCKWISE FROM TOP LEFT: LEAVE NO TRACE CENTER FOR OUTDOOR ETHICS; ALLI BOZEMAN; BEN LAWHON

TOO MUCH TRACE

The idea for promoting no-trace hiking and camping came from the U.S. Forest Service (USFS) in the 1960s in response to increasing public use of trails and campsites in national forests and wilderness areas. By the mid-1980s, the agency had adopted a formal program emphasizing wilderness ethics such as keeping noise at low levels and practicing no-trace backcountry travel and camping. Since then, hikers and campers have embraced the ethic, largely thanks to widespread and relentless promotion by the Colorado-based Leave No Trace Center for Outdoor Ethics.

The center's four teams of educators crisscross the country to train outdoors program organizers, scout leaders, land managers, and others in no-trace backcountry travel strategies. Many of the center's programs target kids. The Bigfoot Challenge, for example, encourages participants to emulate the mythical northland creature, which, the center's website notes, "leaves no trace of his passing through the wild." The Bigfoot program challenges youngsters to "Get Muddy! Commit to walking through the mud in the middle of the trail or stay on deep snow to avoid widening trails which are vulnerable in wet conditions."

Since the nonprofit was formed in 1993, more than 5,000 people have taken the five-day master educator course, 12,000 have gone through the two-day trainer course, and hundreds of thousands have participated in one-day or half-day sessions.

The instruction is paying off. "About 85 percent of the people who've had any exposure to Leave No Trace—from just seeing a slide show to taking the master educator course—say their behavior in the outdoors has changed," says Dana Watts, the center's executive director.

Though a resounding success, LNT could have failed. From its inception, the program was designed as a massive partnership among federal and state land and recreation management agencies, along with cooperating nonprofits and private companies. Partners include the USFS, U.S. Fish & Wildlife Service, National Park Service, Bureau of Land Management, and National Association of Parks Directors. That's a lot of bureaucracy to overcome. According to Roger Semler, assistant administrator for Montana State Parks, it works because every partner buys into the same principles instead of competing with each other. "I think the unified effort among public agencies makes a huge difference," says Semler, previously national LNT coordinator for the National Park Service. "That's so much more effective than having each agency doing its own different program."

Watts says another reason for the success of LNT has been commitment from federal officials in Washington, D.C., all the way down to members of local hiking clubs. She notes that the center now has more than 300 partners—including public agencies, private nonprofits, and corporations such as REI and Subaru.

Both Semler and Watts see the LNT program's reasonable, nonbinding approach as a primary source of its success. LNT is neither regulatory nor absolute. It offers suggestions and principles, not rules or laws. The intent is to lessen the effects of outdoors use, but only voluntarily. "If we were too adamant about every little thing at the expense of common sense, people just wouldn't embrace it like they have," Semler says.

Despite the program's successes, Semler and Watts believe LNT has the potential to reach many more recreationists. "The origin of the program was to take care of the wilderness," Semler says. Now that most backcountry hikers and backpackers have

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Bill Schneider, former editor of Montana Outdoors *and former publisher at Falcon Publishing, now works as outdoor editor at* newwest.net.

adopted the no-trace ethic, he thinks it's time to introduce the benefits of LNT to "frontcountry" campers, anglers, hunters, water recreationists, horsemen, and ATV users. "People in the frontcountry like to see the places where they camp, hunt, and fish remain clean and unspoiled the same as anyone else," Semler says.

Though Semler and Watts acknowledge that many frontcountry recreationists already leave no trace, they believe many opportunities exist to expand the ethic into all aspects of outdoors recreation. "We're making some gains with frontcountry users," says Watts. "But we still have a lot of work to convince the majority to embrace the ethic." She says her organization has produced informational LNT material tailored to hunters and anglers with recommendations such as picking up Styrofoam bait containers, monofilament line, spent shotgun shells, and other litter; keeping ATVs on designated trails and roads; and setting up no-trace campsites.

For cooking, Watts recommends using a backpacking stove, building a minimal-impact fire with no fire ring, or at least using an existing fire ring rather than building a new one. "We're not saying don't have a fire," she says. "But consider having fewer fires or building ones that leave less of a trace." After repeated use, the fire and carbon in a fire ring sterilize the soil, Watts explains. Also, the rings often fill with foil, cigarette butts, melted plastic, and other garbage. "They're eyesores to many people," she says.

A DELICATE SUBJECT

Human waste is another big concern, especially near water. Recently FWP considered requiring river recreationists on the popular Smith River to pack out their human waste, as required on many major multiday-float rivers across the West. Pit toilets currently provided on the Smith often fill rapidly. That requires digging new holes, which damages soil and vegetation. The toilets also have the potential to leak into groundwater and contaminate the renowned fishing and floating river. FWP eventually decided to make the action voluntary and, for now, pit toilets remain at the campsites.

The Seven Principles of Leave No Trace

1. Plan ahead and prepare
2. Travel and camp on durable surfaces
3. Dispose of waste properly
4. Leave what you find
5. Minimize campfire impacts
6. Respect wildlife
7. Be considerate of other visitors

leave no trace
CENTER FOR OUTDOOR ETHICS

Learn more at lnt.org

But pit toilets are not the long-term solution—on the Smith or on other rivers. Semler says river users need to think of other, more environmentally friendly options. One is to use a cathole—a small hole you dig with a hand trowel and cover up afterward. No-trace principles recommend that a cathole be at least 200 feet from the water. In Montana, that could conflict with the state's stream access law. The law allows public access on rivers only up to the ordinary high-water mark, which is often less than 200 feet from the stream. That's another reason Semler recommends river users consider packing *everything* out. Though that takes extra planning and a change in habits, Semler says "there are several excellent systems and products now available for packing waste out of rivers."

Watts hopes guides and outfitters will emerge as leaders in selling the idea of proper waste disposal and other no-trace ethics to their clients. I can see it working. Every fishing guide I've used has a set of "boat rules," such as safety tips and strict canons on carefully releasing fish. A few no-trace suggestions like taking along a trowel or a pack-out system and asking clients to use it for nature calls would certainly fit.

People can learn to change even long-held habits. Many backcountry horsemen, for instance, are now embracing LNT. Horses can trample lakeshores, litter campsites with horse "apples," and gouge out unofficial trails in alpine areas. But in recent years, pack and saddle stock users have begun adopting no-trace principles. Bob Hoverson, lead trainer at the Lolo National Forest's Ninemile Wildlands Training Center, has spent most of the past 20 years teaching LNT courses to agency personnel, outfitters, and individual stock users. "The program has been tremendously successful," he says. "In the old days, an outfitter might take 50 clients and 150 stock animals out on a single trip. There's not a campsite I know of that can handle that kind of impact. Over the years the number of people and number of stock animals has been reduced, so the impact is automatically less."

Hoverson teaches users to reduce their hoof print in the backcountry by not tying horses to trees, staying on established trails, and removing droppings from trailheads and campsites. "We still have some problems," he says, "but we recognize that we can do things correctly and minimize the impact. It's just as easy to do it right as it is to do it wrong."

Watts believes that kind of common-sense thinking will continue to resonate with other people in the outdoors. Whether you are a wilderness camper in the Bob Marshall Wilderness or a walleye angler on Fort Peck Lake, it only makes sense, she notes, to not make scenic areas ugly for others. And almost everyone appreciates walking along trash-free, uneroded trails and arriving at a campsite free of toilet paper and garbage. Believing in these universal values gives Watts, who has spent the last 15 years leading LNT, hope she can reach even more people: "One reason I'm still around is that we still have a lot of folks out there to convince."

COGHLANS.COM

PHOTOS BY BECKY LOMAX

ADDITIONAL AND ESSENTIAL

EYES AND EARS

Volunteer citizen scientists across Montana help gather vital information for wildlife and fisheries research projects. BY BECKY LOMAX

As Kjell Petersen scrambles along a steep, rocky slope in one of the world's most scenic parks, he's not marveling at the picture-book vistas surrounding him—the breathtaking waterfalls, deep mountain valleys, and fields of alpine wildflowers that attract visitors to Glacier National Park each summer. His eyes are glued to the ground.

Petersen is looking for the droppings of American pikas, gerbil-sized mammals that live in high-mountain environments. After spotting a small pile of cut, dried grasses stashed by pikas as winter food, he uses a stick to push brown, BB-sized pellets into a small envelope. Steve Penner takes a GPS reading on the location of the "hay pile," while his wife Barb Penner notes data about the pika site on a small chart.

Petersen is a part-time ski instructor, Steve Penner a forester, and Barb a ski lodge employee. None has a degree in biology, but all have an avid interest in wildlife. And along with other participants in the High Country Citizen Science Program, all three help professional biologists gather essential data for wildlife research in Glacier. In this case, the information will help scientists plan future monitoring to learn whether climate change is reducing pika numbers. "They've helped us gather an incredible amount of data compared to what we could obtain with our one technician who monitors high-mountain species," says Jami Belt, citizen science program organizer for the Crown of the Continent Research Learning Center, a National Park Service research facility. She notes that last summer the trio and 83 other citizen scientists combed the park's backcountry for tracks, scat, and sightings of pikas, mountain goats, and Clark's nutcrackers. "We don't have a population baseline for these species and don't know where they are located throughout the park. The citizen science program helps us gain that information," says Belt.

Across Montana, a growing number of citizens help science by listening for toad calls, reporting wolf sightings, counting birds, and even fishing. The volunteers learn more about wildlife and

A DIFFERENCE Perched on a rocky slope in Glacier National Park, Steve Penner records information called out by Kjell Petersen, who searches for sign of pika (below left) as part of the High Country Citizen Science Program. Says Petersen: "You feel like you're doing the most important thing out there, and that what you do will make a difference."

science while cash- and staff-strapped public conservation agencies and scientific nonprofits get invaluable help gathering essential information used for applied research. "The more we know about wildlife behavior and habitat, the better we can conserve populations and habitat," says Kristi DuBois, a wildlife biologist for Montana Fish, Wildlife & Parks in Missoula. "Our big hitch is that we don't have the funding or personnel to do all the work that needs to be done. For us, citizen science volunteers are priceless."

Ordinary people have long been studying the natural world, such as watching where birds nest in spring, tracking star movement across the night sky, and recording when different plants flower. But not until 1900, when the National Audubon Society began its annual Christmas Bird Count, did an organization begin to systematically gather large numbers of citizen observations and put the information to use. Now in its 110th year, the annual Audubon program invites volunteers from across North America to count bird species over three weeks in midwinter. The century-long data set shows population trends, like the long-term decline in boreal chickadees, that scientists might otherwise miss.

Birds are the subject of many other citizen science programs. In Montana, landowners voluntarily monitor bluebird houses on their property in cooperation with the nonprofit Mountain Bluebird Trails. In September, volunteers with the Wildlife Research Institute count migrating golden eagles at Rogers Pass. More than two dozen volunteers assist FWP biologists each summer looking for falcons, hawks, and other birds of prey as part of the Montana Raptor Survey Route ("Following Raptors' Ups and Downs," March-April 2009).

The U.S. Geological Survey (USGS) monitors bird population trends each June using information gathered by volunteers across North America who take part in the agency's annual Breeding Bird Surveys. Each of the 60 routes in Montana requires four hours of surveying. Volunteers drive a pre-assigned 25-mile-long route, stopping every half mile to look—and more effectively, listen—for birds. "We really depend on skilled volunteers with good hearing and the ability to recognize different mating songs," says Dan Sullivan, a Helena retiree who organizes the surveys in Montana.

Some science research projects benefit from the enormous commitments made by just a few individual volunteers. On his own time, Michael Schwitters of Choteau, a retired Air Force colonel, recorded the identification numbers of 40,000 collared snow geese—from the Arctic to Montana's Freezout Lake to California—and supplied the information to FWP and the U.S. Fish & Wildlife Service (USFWS). State and federally licensed banders Ned and Gigi Batchelder of Hamilton have caught and banded thousands of hummingbirds in Montana and other states, forwarding the information to a federal bird research facility in Maryland.

BOB MARTINKA

Licensed banders Ned (above) and Gigi Batchelder of Hamilton have trapped and banded thousands of hummingbirds, sending the information they gather to a federal conservation facility.

> "Our big hitch is that we don't have the funding or personnel to do all the work that needs to be done. For us, citizen science volunteers are priceless."

PHOTOS BY KRISTI DUBOIS/MONTANA FWP

David Jurovich, 11, of Billings, found this snapping turtle last summer during the Yellowstone River Bioblitz. In bioblitzes, citizen scientists perform a one-day inventory of all living organisms in a specified area. FWP biologists tagged the turtle with a radio transmitter and released the reptile to track its movement.

KRISTI DUBOIS/MONTANA FWP

Retired cardiologist and active citizen scientist Carolyn Goren of Missoula plays recorded flammulated owl calls during a survey coordinated by the Avian Science Center and Montana Audubon.

"This is much more than a hobby for us," says Ned Batchelder. "It's our passion."

Other volunteer-fueled projects require far less effort. The Great Backyard Bird Count—run by the National Audubon Society and the Cornell Lab of Ornithology—only asks volunteers to count birds they see in their yard during a 15-minute period over President's Day weekend. In 2008, participants submitted more than 85,000 checklists and recorded 634 species across North America as part of the backyard survey.

Many conservation agencies and nonprofits rely on volunteers to supplement existing research work. Allison Begley, an FWP wildlife biologist in Billings who coordinates Montana's portion of the North American Amphibian Monitoring Program, says volunteers listening for breeding calls each spring in the state's eastern half help her monitor a wider geographic area for a longer time. "Frogs and toads are particular about where and when they breed, and they can be quiet for days and then go gangbusters all of a sudden," she says. "Our biologists are out there listening, but there's huge value in also having additional ears out there to fill in the picture." The 4,472 hours that volunteers donated to Yellowstone National Park's various wolf research projects in 2008 is the equivalent of four additional full-time field technician positions, according to Yellowstone Wolf Project coordinator Doug Smith. FWP wildlife research supervisor Justin Gude says elk hunters have saved FWP tens of thousands of dollars by volunteering to draw blood from the cow elk they kill. Hunters use kits supplied by the agency and mail their samples to the FWP wildlife laboratory in Bozeman, which tests for brucellosis, a disease that can infect nearby cattle. "We can't afford to do the blood draws ourselves, and since hunters are out there anyway, their volunteer effort makes a lot of sense," says Gude.

Work by volunteer citizen scientists occurs across the state and throughout the year. In fall, hunters voluntarily submit deer heads to the FWP wildlife lab for chronic wasting disease testing. Waterfowl hunters send duck wings and goose tail feathers to the USFWS. Hunters and others help monitor wolves and mountain lions by reporting sightings and activity on the FWP website and during phone surveys. Volunteers help FWP and

FISHING FOR SCIENCE

Anglers across Montana have been volunteering to help with the FWP Fishing Log Program since it began in 1951. Last year the department recruited 952 anglers to keep diaries of their fishing effort and catch. Biologists use the information to track trends in the size and species anglers catch and also to determine catch rates. "With more than 3,000 miles of streams and 450 lakes in our region alone, there's no way FWP biologists can get to every water body and monitor it," says Jim Vashro, FWP fisheries manager in northwest Montana, who has been keeping a personal fishing diary as part of the program for the past 23 years.

Yellowstone National Park runs similar programs. One asks anglers to voluntarily report their catch, providing information that helps park fisheries managers track changes in specific trout populations. Another program recruits anglers willing to tackle specific challenges, such as catching and tagging arctic grayling in certain waters or hiking into backcountry areas to probe lakes and streams for trout.

BILL BUCKLEY

USGS biologists capture black and grizzly bear hair for DNA analysis. FWP uses volunteers to monitor Caspian terns, white pelicans, and other colonial waterbirds. To keep closer tabs on elk populations in the Elkhorn Mountains, FWP asks hunters and landowners to report sightings on the agency's website. Volunteers also help monitor winter range conditions for the Rocky Mountain Elk Foundation, check peregrine falcon nests for the Montana Peregrine Institute, and record stream conditions for Trout Unlimited.

Montana's largest citizen-fueled scientific database collects observations year-round of mammals, birds, and "of concern" plant species through the Montana Natural Heritage Program's on-line Natural Heritage Tracker. The program was launched in 2007 and has logged more than 750,000 observations. The data is available to anyone but is used mainly by the U.S. Forest Service and other land management agencies to identify species that might be present in proposed timber sale sites and developments undergoing environmental analysis.

BOB MARTINKA

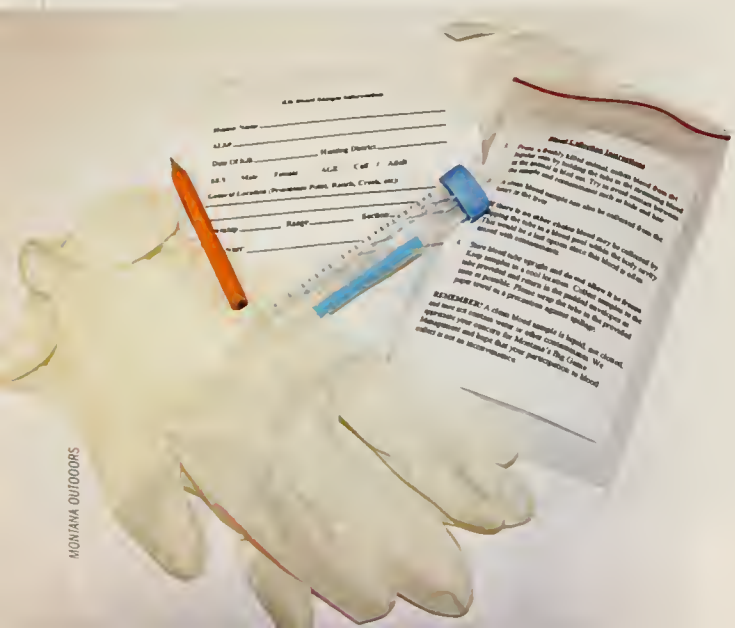
Volunteer observations and other work is scientifically valuable only when conducted according to rigorous protocols. "Scientists need reliable data," says Gude. "To get that, field methods must be tested, trustworthy, repeatable, and consistent." Volunteers in many citizen science programs are taught how to accurately collect and record data. The University of Montana's Avian Science Center has trained dozens of people over the past two summers to locate flammulated owls in the state's western half. Organizer Amy Cilimburg shows volunteers how to make owl calls, fill out data forms, and use GPS units to find recording sites at night. Participants in the amphibian monitoring program learn how to identify frogs and toads by the species' mating calls. To ensure reliable survey results, all participants must follow the same protocol of driving a 10-mile route after dark, stopping every mile to listen for five minutes, and then record the species they hear. This must be repeated three times during the spring season, year after year.

Becky Lomax is a writer in Whitefish.

> "You get totally swallowed up in the adventure of it."

If volunteers don't gather samples according to necessary standards, the information may be useless. When FWP first used hunters to collect blood from harvested elk to test for brucellosis in the Greater Yellowstone Area, only 10 percent of samples were usable. To improve volunteer blood-gathering efforts, says Gude, FWP clarified its explanation to hunters about how, where, and when to draw blood samples. This year more than 80 percent of samples were adequate to submit for brucellosis testing.

Volunteering to help science has its perks. Citizen scientists get to spend time afield learning from experts. And they gain satisfaction knowing their work contributes to conservation. Ryan Rauscher, an FWP biologist in Glasgow who coordinates the Montana Raptor Survey Route, has seen how volunteers embrace their work and its importance to science. "Our project gives them a sense of ownership in the data, and they take great



MONTANA OUTDOORS

GIVE BLOOD To increase the number of elk it tests for brucellosis, a disease that can infect nearby cattle, FWP asks hunters to draw a blood sample from their kill. Elk hunters are sent a collection kit containing rubber gloves, a syringe, and detailed instructions for obtaining a fresh and clean blood sample.

HORNED LARKS BUT NO FRENCH HENS Since 1908, when the first Montana Audubon Christmas Bird Count was conducted in Bozeman, thousands of participants have identified 207 species, including horned larks (above left), and nearly 200,000 individual birds. This year's midwinter survey ran from December 14, 2009 to January 5, 2010. "Volunteers are the lifeblood of bird conservation organizations like ours," says Steve Hoffman, executive director of Montana Audubon. "They get so engaged and invested in the work they do for us, and that only strengthens the passion they already have for birds and other wildlife."

pride in completing their routes," he says.

Citizen science participation is growing. In just one year, the number of people volunteering to help monitor loons in Glacier National Park doubled from 77 to 156. FWP's Dubois and Begley report that as public interest in amphibians, reptiles, bats, and other nongame wildlife grows, so do calls from people across Montana asking how they can participate in research projects.

Studies show that people who love the natural world want experiences that add knowledge and significance to their time outdoors. More people are signing up for environmental education tours, outdoors classrooms, and nature seminars. And more are craving the intimate, hands-on learning that comes from helping with research projects across Montana. "You get totally swallowed up in the adventure of it," says Petersen, the volunteer who spent several days last summer gathering wildlife information in Glacier National Park. "You feel like you're doing the most important thing out there, and that what you do will make a difference."

BECOME A CITIZEN SCIENTIST

REPORT

- observations of wildlife or "of concern" plant species through the Natural Heritage Tracker: **mtnhp.org/tracker/**
- wolf sightings and activity through the FWP website: **fwp.mt.gov/wildthings/wolf/**. Click on "Report a wolf observation."
- sightings of birds to the Natural Audubon Society and Cornell Lab of Ornithology at: **ebird.org/content/ebird**
- observations of buds and first flowers for the BudBurst climate change studies at: **www.windows.ucar.edu/citizen_science/budburst**

JOIN

- Montana Audubon's Christmas Bird Count or other volunteering opportunities: **http://mtaudubon.org/birds/citizen.html**

E-MAIL FOR MORE INFO

Glacier National Park's High Country Citizen Science Program: **jami_belt@umontana.edu**

USGS Breeding Bird Surveys: **Dsullivan01@bresnan.net**

Mountain Bluebird Trails Bluebird Box Monitoring Program: **mountainbluebirdtrails.com**

BECKY LOMAX

FWP nongame wildlife volunteering opportunities: **kdubois@mt.gov**, **lhanauska-brown@mt.gov**, or **rrauscher@mt.gov**

FWP Fishing Log Program: **fwp.mt.gov/fishing/guide/fishingLog/**

Yellowstone National Park's Volunteer Flyfishing Program: **wfv100@psu.edu** or **bywater@dixie.edu**

WILDLIFE CULTURE A juvenile red-tailed hawk looks for prey in a meadow, part of an ambitious 11,000-acre wetlands-complex restoration project on the Flathead Indian Reservation. Another major tribal wildlife project is the recent installation of 43 passageways (right) along 56 miles of newly reconstructed U.S. Highway 93. The aboveground and underground tunnels reduce vehicle collisions with wildlife and restore habitat connectivity broken by the motorway.

KEVIN R. FREDENBERG

CONSERVING WILDLIFE
(and Culture) on the Flathead Indian Reservation

The Confederated Salish and Kootenai Tribes use the latest science to successfully manage grizzlies, deer, swans, falcons, and other species in harmony with traditional values. **BY DARYL GADBOW**

STEVE MITCHELL

For decades, wildlife species ranging from moose to mice have tried to cross busy U.S. Highway 93 in western Montana. Usually they made it through the stream of trucks and cars, but too often they didn't, resulting in injured and dead deer, bears, bobcats, and other species. Then there was the hazard to motorists. On some stretches, nighttime drivers faced a gauntlet of wild critters, the animals' eyes glittering in frozen reflection as speeding vehicles swerved past.

Today the highway is safer for both people and wildlife. Beginning in 2006 on a newly reconstructed 56-mile stretch through the Flathead Indian Reservation, wildlife began making the perilous crossing often unseen by the stream of passing motorists. Thanks to a cooperative effort between the Confederated Salish and Kootenai Tribes (CSKT) and state and federal highway agencies, new wildlife passageways make the motorway permeable to animal movement while reducing both traffic accidents and the likelihood of wildlife becoming roadkill.

Much credit for the passageways project goes to the CSKT's Tribal Wildlife Management Program. This little-known unit of the Tribes' Division of Fish, Wildlife, Recreation & Conservation is responsible for conserving wildlife on the 1.34 million-acre reservation, an area larger than Delaware. The staff of seven biologists, four wildlife technicians, a habitat restoration ecologist, and program manager Dale Becker work on everything from game species such as pheasants to federally protected animals like grizzly bears. That wildlife diversity comes from a varied natural environment ranging from high-elevation alpine terrain in the Mission Mountains to wetlands complexes and sagebrush grasslands in the Flathead Valley. "The reservation has an incredible mix of wildlife species," Becker says, "and that creates an incredible mix of wildlife and habitat issues."

A GOOD FIT

Becker says wildlife has always been an integral aspect of tribal culture, which guides and

directs the reservation's wildlife management program. His team meets regularly with the Tribal Council, culture committees, and tribal elders to discuss projects and how they mesh with the Tribes' overall goals. Becker says tribal leaders have asked him and his staff to maintain viable and stable wildlife populations, restore habitat, and conserve all species, especially indigenous ones. "Those cultural goals make a good fit with biologists' overriding philosophy that all species are important parts of the environment," he says.

The tribal wildlife program works closely with state agencies including Montana Fish, Wildlife & Parks. "It's rare when the Tribes' wildlife management objectives don't mesh with ours," says Jim Williams, FWP regional wildlife manager in Kalispell. One joint project is a cooperative hunting and fishing agreement between FWP and the Tribes, in place since 1990, which allows hunting and fishing on the Flathead Reservation by people who are not tribal members. Another is the cooperative management by the Tribes with FWP of a shared bighorn sheep herd in the Perma-Paradise area for hunting by both tribal members and the general public.

JEREMIE HOLLIMAN

KRISTI DUBOIS/MONTANA FWP

TEAM APPROACH The Tribal Wildlife Management Program has worked with the U.S. Fish & Wildlife Service to successfully restore trumpeter swans and leopard frogs—two species that had disappeared from the Flathead Indian Reservation.

"Those (tribal) cultural goals make a good fit with biologists' overriding philosophy that all species fit into the whole ecology."

Becker's staff also works with the U.S. Fish & Wildlife Service (USFWS) on trumpeter swan, leopard frog, and peregrine falcon reintroductions, grizzly bear and wolf management, bison hunting by tribal members, and bat research.

One of the Tribes' most important wildlife projects helps offset damage to thousands of acres of tribal wetlands and other wildlife habitat caused when Kerr Dam was built on the Flathead River in the 1930s. Using mitigation funding the Tribes negotiated from the dam's corporate owner and the Federal Energy Regulatory Commission, the wildlife program has spearheaded the acquisition of more than 11,000 acres of wetland and riparian habitat on the reservation owned by non-tribal members. Becker says restoration of those ecologically rich habitats, many damaged by drainage, tillage, and overgrazing, is ongoing. According to Williams, the restored wetlands, combined with additional ones recently acquired and restored by FWP and the USFWS, are creating a rich wetlands complex in the Mission Valley. "It also opens up public access to some incredible waterfowling and other hunting," he adds.

Daryl Gadbow is a writer in Missoula.

DEER UNDER THE ASPHALT

If all this activity weren't enough, Becker and his staff have also spent much of the past decade helping wildlife move unharmed from one side of U.S. Highway 93 to the other. The animals' safe passage is made possible by

43 crossing structures integrated into the highway reconstruction under an agreement—the culmination of years of negotiations starting in the 1990s—among the CSKT, the Montana Department of Transportation, and the Federal Highway Administration. Tribal wildlife biologists, along with representatives of the state and federal highway agencies, visited Banff National Park in Alberta to learn about overpass and underpass structures. They also studied underground corridors used successfully in Florida and Europe.

The initial 42 underground passageways on U.S. Highway 93 were sited at spots from Polson to Evaro Hill that had significant wildlife losses. So that animals would be funneled toward the 12-foot-high culverts, fencing was installed on both sides of the highway where the passageways were built.

The underground wildlife corridors worked. On one curvy highway stretch near Ravalli notorious for deer collisions, accidents immediately and dramatically declined after passageways and fencing were installed. "That shows how the structures are enhancing safety both for wildlife and the people driving the highway," says Becker.

Motion-detecting cameras installed in the underpass crossings have documented a wide range of species. "We have tons of wildlife going through," says Whisper Camel, a wildlife biologist assigned to monitor the crossings. On one highway section north of St. Ignatius, cameras at three closely located underpass crossings documented in 2008 a combined total of 3,647 white-tailed deer, one black bear, and 110 "miscellaneous species," including bobcats, muskrats, skunks, raccoons, badgers, mice, rabbits, wood rats, weasels, pheasants, and partridges. That same year at a crossing in grassland habitat on Ravalli Hill, a camera recorded 23 black bears, one elk, 147 mule deer, 17 mountain lions or bobcats, 121 coyotes, and 145 miscellaneous animals. Even grizzly bears and otters move through the tall culverts. "Each time an animal uses the passageways, that represents a collision with a vehicle that might have otherwise occurred," Becker says.

Initially, the wildlife program staff was concerned the underground crossings would act as "predator traps," where foxes, coyotes, and other carnivores would lie in wait for prey animals concentrated at the culvert openings. "We haven't documented any of that happening other than one owl that hangs out on a camera and pounces on small mammals and birds," Camel says.

CAUTION: MOOSE OVERHEAD

The newest crossing structure allows wildlife to travel *over* traffic. Located on Evaro Hill, about 20 miles north of Missoula, the new overpass is built of 33 concrete rings forming a tunnel above the highway 54 feet wide and nearly 200 feet long. The top is covered with 17,000 cubic yards of dirt that will be planted with vegetation this summer to give the wildlife walkway a natural appearance. The price tag for the structure, completed in August 2009, was $1.88 million. "There's nothing like this in Montana and nothing quite of this type in the entire United States," says Pat Basting, a wildlife biologist for the Montana Department of Transportation.

Becker calls the overpass a "sliver of continuous habitat" that allows large animals—

CONFEDERATED SALISH & KOOTENAI TRIBES

RON HOFF

BIG PICTURE APPROACH
Maintaining historical habitat connectivity is a goal of the CSKT, says tribal wildlife program manager Dale Becker (above, overlooking the lower Flathead River.) "On the reservation, wildlife is viewed as both a natural resource and a cultural resource," he says. Helping protect wildlife from vehicles is the new Evaro overpass (left), 20 miles north of Missoula, the only one of its kind in the United States.

VERIFIED Motion-sensing cameras and animal tracking beds monitor wildlife using the underground crossing structures. Clockwise from top left: bobcat, owl, mountain lions, whitetail doe, camera, black bear. Below: A restored wetland on the Flathead Indian Reservation.

PHOTOS COURTESY OF CONFEDERATED SALISH & KOOTENAI TRIBES AND MONTANA DEPARTMENT OF TRANSPORTATION

moose, elk, deer, and bears—to cross the busy highway. "It's a connective corridor between the Seeley-Swan Range and the Selway-Bitterroot Wilderness," he says.

Additional underground passageways are planned along the highway in the Ninepipe area. Smaller culverts, designed for smaller animals such as turtles and frogs, will reconnect wetlands bisected by the highway. Larger ones will link riparian habitats.

According to Becker, these and previously installed structures "serve a greater function in maintaining habitat connectivity for wildlife on both sides of the highway." FWP's Williams calls the Tribes' wildlife passageway system "cutting edge" and adds that "as far as I know, it's the most significant, large-scale habitat-linking wildlife project in the western United States."

Give credit to the tribal biologists and the state and federal highway engineers who made the culvert and bridge crossings possible. But give some to wildlife, too. When given half a chance, they'll do their best to find a safe way home.

CHUCK HANEY

Whitebark Pine

Pinus albicaulis

BY LAURA ROADY

SUMIO HARADA

Last summer while hiking a ridgeline in the Purcell Mountains north of Libby, I spotted a whitebark pine growing from a rock crevice with barely enough soil to cover its roots. Like those of many whitebark pines, the trunk was twisted as if in anguish, an indication of the harsh, wind-blasted environment where this hardy conifer lives. A pioneering species of subalpine and alpine ecosystems, the whitebark is able to grow in nearly sterile soils on exposed slopes where almost no other trees can exist. But the growth is slow. In Montana, botanists have identified 900-year-old specimens, and in Idaho's Sawtooth Mountains they have located the world's oldest recorded whitebark pine, a tree 1,260 years old.

IDENTIFICATION

The whitebark pine's smooth, rigid needles, 1.5 to 3 inches long, grow in clusters of five near the ends of upswept branches. The bark is smooth and pale gray. Whitebark pines can grow up to 60 feet tall in moister areas, but they are usually much shorter. Constant strong winds in alpine areas can contort the trunk and cause stunting. In especially harsh environments, whitebarks often form thickets of shrublike trees called *krummholz*.

RANGE

The whitebark pine is found in all major mountain ranges of central and western Montana at elevations between 5,900 and 9,300 feet. The species also grows in the Rocky Mountains from Wyoming to Alberta, coastal mountain ranges of British Columbia, isolated ranges in eastern California, and the Cascades of Washington and Oregon.

Laura Roady is a writer in Bonners Ferry, Idaho.

CONES

The whitebark pine's purple, nearly round cones average 2.5 inches long and have thick, pointed scales. Unlike the cones of other pine species, they do not open upon drying. Their pea-sized, nutlike seeds are wingless and much larger than those of other conifers.

Whitebark pine seeds are 50 percent fat, making them an important high-calorie food for 110 wildlife species, including Clark's nutcrackers, red squirrels, black bears, grizzly bears, pine grosbeaks, and golden-mantled ground squirrels.

ECOLOGICAL INTERACTIONS

A mutually beneficial relationship has co-evolved between the whitebark pine and the Clark's nutcracker. The bird uses its long beak to pry open cones and carries seeds to storage sites in an interior throat pouch. In years of heavy cone crops, a single Clark's nutcracker can cache nearly 100,000 seeds. The birds store the seeds in open areas with bare soils, such as burns, where the conifer thrives. Because the seeds remain viable for more than a year, those not eaten can grow and recolonize burned areas. In years of light cone crops, wildlife may eat all the seeds, leaving none for regenerarion.

WILDLIFE VALUE

Whitebark pine seeds are a favorite food of grizzlies. The bears raid squirrel middens (cone caches) containing the nutritious nuggets. In years with heavy cone crops, the protein-rich seeds can comprise 40 percent of a bear's diet. During years of light seed production, grizzlies in Yellowstone National Park often must forage farther and at lower elevations, where they can run into trouble when near cabins, livestock, and elk hunting camps.

STATUS

The whitebark pine is threatened by white pine blister rust and the mountain pine beetle epidemic. The conifer-killing beetles have thrived in recent years because winters have lacked the extreme low temperatures that kill them.

According to Robert Keane, a research ecologist at the U.S. Forest Service Rocky Mountain Research Station in Missoula, the whitebark pine is dying out across much of its range in Montana. The most serious declines are in and around Glacier National Park and the Blackfeet Indian Reservation, as well as in Yellowstone National Park and its surrounding environs.

In September 2009, U.S. District Court Judge Donald Molloy cited the whitebark pine decline as one reason for ordering that the roughly 600 grizzly bears in and around Yellowstone National Park be returned to the federal threatened species list, from which they were removed two years earlier. "There is a connection between whitebark pine and grizzly survival," Molloy wrote in his ruling.

PARTING SHOT

PINE PORTAL A tunnel opening frames a whitebark pine in the Helena National Forest near Refrigerator Canyon. Disease and beetle infestations have caused large numbers of this hardy, high-altitude species to die out recently. Learn more about the pine on page 41. Photo by Jesse Lee Varnado.

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